

Architecture of Grammar, day 3

DGfS Summerschool 2024 University of Göttingen

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DGfS Summerschool 2024, University of Göttingen, Aug. 12-16, 2024




Movement

Standard view: Movement structures involve:

- 1 a semantic binding relationship like pronouns and other elements
- 2 a syntactic identity relationship: structure sharing / remerge / Hopf algebra (Marcolli et al. 2023)

Example: Movement involves enumeration index identity and semantic coindexation:

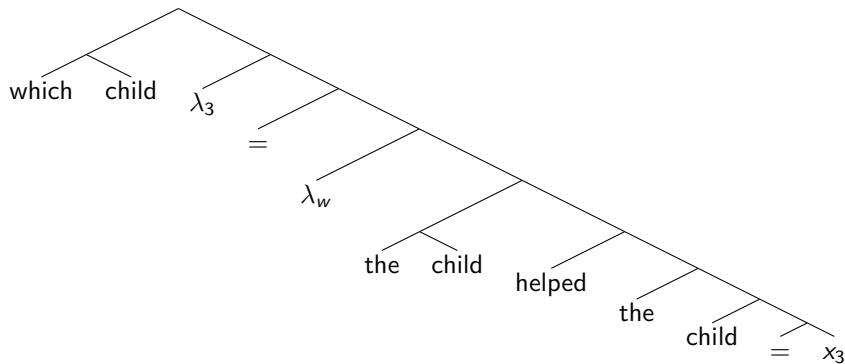
- (1) Which child did the child help t ?
- (2) [$\langle \text{which}, 1 \rangle \langle \text{child}, 1 \rangle$] $\lambda_3 <_{\text{QUESTION}, 1} \langle \text{did}, 1 \rangle$ [$\langle \text{the}, 1 \rangle \langle \text{child}, 2 \rangle \langle \text{help}, 1 \rangle$] [[$\langle \text{which}, 1 \rangle \langle \text{child}, 1 \rangle$] 3]
- 

At PF: Pronounce each enumeration item at most once.

At LF, LF 'Trace conversion', ignore enumeration indices otherwise:

- (3) [$\langle \text{which}, 1 \rangle \langle \text{child}, 1 \rangle$] $\lambda_3 <_{\text{QUESTION}, 1} \langle \text{did}, 1 \rangle$ [$\langle \text{the}, 1 \rangle \langle \text{child}, 2 \rangle \langle \text{help}, 1 \rangle$] [[$\langle \text{which}, 1 \rangle \langle \text{child}, 1 \rangle$] x_3]
- (4) [[$\langle \text{which}, 1 \rangle \langle \text{child}, 1 \rangle$] x_3] \mapsto [$\langle \text{the}, - \rangle$] [$\langle \text{child}, 1 \rangle$ [EQUAL-TO x_3]]]

Question interpretation (standard á la Karttunen)



Meaning First perspective

- If meaning is first (Sauerland & Alexiadou 2020), we expect just a commutative Free Magma, i.e. planar binary trees.
- I.e. No pronunciation/enumeration indices at the conceptual representation, these are introduced only for communicative use.

Chain without identity 1: Resumptive pronouns

Person mismatch with Dinka resumptive *ké(ek)* (van Urk, 2018):

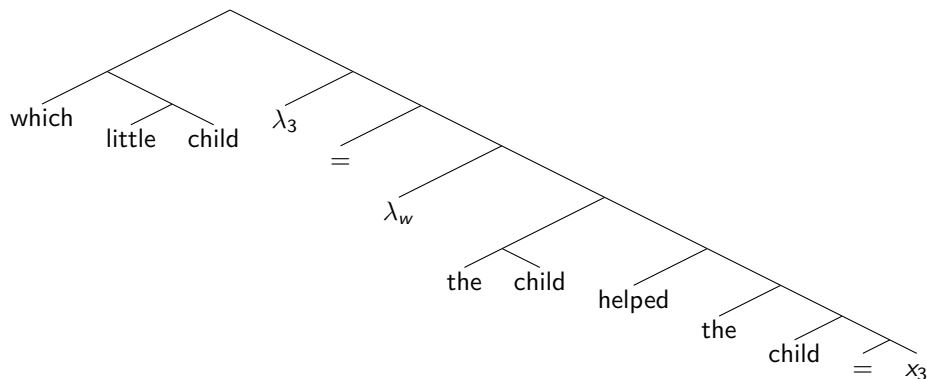
- (5) *Wêek cí Áyèn ké tîiN*
2PL PRF.OV Ayan.GEN 3PL see.NF
'You all, Ayan has seen [them].'

Van Urk's proposal: Movement of plural 'you' followed by PF-deletion of 2-nd person features in a chain. (also: Scott 2021, Mendes & Ranero 2021, Georgi & Amaechi 2022)

- (6) [SECOND, PL] cí Áyèn [SECOND, PL] tîiN.
 ↑ |
 2nd PL 2nd PL
 'You (2nd PL) are going to see him (2nd PL) tomorrow.'

Chains without identity 2: Late adjunction

No contradiction as long as intersective (Sauerland 2004):




Late and early adjunction don't differ in interpretation though.

Late Merge in Extraposition

Example: 'Extraposed' adjuncts in English (Fox & Nissenbaum 1999)

- (7) *I looked for a/*any picture very intensely by this artist.*
(a \gg look for, *look for \gg a)

Fox & Nissenbaum's proposal: Unpronounced 'overt' movement of 'a/any picture' followed by insertion of 'by this artist'. (also: Lebeaux 1991, 2009, Sauerland 1998, Fox 2000)

- (8) I looked for a picture very intensely a-[picture by this artist]
- 
- The diagram consists of a horizontal purple line with a vertical arrow pointing upwards at its right end. The line starts under the word 'a' and extends to the right, ending under the word 'picture' in the phrase 'a-[picture by this artist]'. This represents the movement of the object 'a picture' to the right edge of the clause.

Fox (2017): Support for double interpretation

Apparent locality of extraposition:

- (1') a. John saw an $[_{NP}$ alleged $[[$ mouse $]$ $[$ from Mars $]]]$
 $\exists x$ [alleged $[\lambda w.$ mouse(w, x) & from-Mars(w, x)] & J. saw $x]$ (*alleged* > &)
 b. John saw an $[_{NP}$ [alleged mouse] $[$ from Mars $]]]$
 $\exists x$ [alleged $[\lambda w.$ mouse(w, x)] & from-Mars(x)] & J. saw $x]$ (& > *alleged*)

Extraposition seems to disambiguate:

- (2) John saw an alleged mouse yesterday from Mars.
a. ~~$\exists x$ [alleged $[\lambda w.$ mouse(w, x) & from-Mars(w, x)] & J. saw $x]$~~ (~~*alleged* > &~~)
b. $\exists x$ [alleged $[\lambda w.$ mouse(w, x)] & from-Mars(x) & J. saw $x]$ (& > *alleged*)

Paraphrase of only available meaning (if locality is correct): *There is something John saw which is alleged to be a mouse and in reality is from Mars.*

Pesetsky's observation

(3) John saw an alleged alien yesterday from Mars.

Predicted meaning:

$\exists x$ alleged[λw . alien(w, x)] & from-Mars(x) & J. saw x (allege & from Mars)
#There is something John saw which is alleged to be an alien and in reality is from Mars.

Analysis:

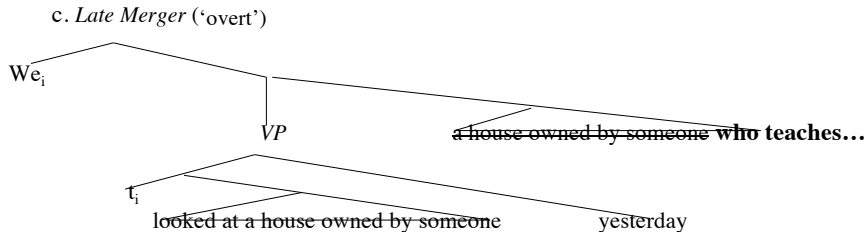
- (3') a. [An alleged [alien from Mars]]
 λx John saw [the _{x} alleged alien]
 b. [An [[alleged alien] from Mars]]
 λx John saw [the _{x} alleged alien]

Lower late adjunction

Low relative clauses can be extraposed:

- (16) a. I bought a car owned by Fred.
b. *By whom did you buy a car owned?
- (17) ? We [[[looked at [a house owned by someone]] yesterday] who teaches at UCLA].

Analysis:



Modified Williams Generalization

- (22) **Modified Williams's generalization (MWG):** When an adjunct β is “extraposed” from a “source QP” α , there must be a QP α' which is either identical to or dominates α (α' reflexively dominates α) and the scope of α' must be at least as high as the attachment site of β (the extraposition site).
- (30) a. John did nothing prohibited by anyone, without being reprimanded, who teaches in this school.
b. #John did nothing required by anyone, without being reprimanded, who teaches in this school.
- (31) a. You can do nothing prohibited by anyone, without being expelled, who teaches in this school.
b. #You can do nothing required by anyone, without being expelled, who teaches in this school.

More evidence for double interpretation

- (20) a. I'll [[explain [a paper that was recommended by a linguist] when we meet] who teaches at UCLA].
b. *I'll [[explain [a paper that wasn't recommended by any linguist] when we meet] who teaches at UCLA].

(20)' **LF representations for (20) (by local QR + embedded LM)**

- a. [A paper that was recommended by a linguist who teaches at UCLA].
I'll explain [a paper that was recommended by a linguist]
b. [A paper that wasn't recommended by anyone who teaches at UCLA]
I'll explain [a paper that wasn't recommended by anyone]

(20a)" **Interpretation of (20a)' (by Trace Conversion)**

$$\begin{aligned} & \llbracket \text{A paper that was recommended by a linguist who teaches at UCLA} \rrbracket \\ & (\lambda x \llbracket \text{I'll explain [the}_1 \text{ paper that was recommended by a linguist}] \rrbracket^{1 \rightarrow x}) \\ = & \llbracket \text{A paper that was recommended by a linguist who teaches at UCLA} \rrbracket \\ & (\lambda x: x \text{ is a paper that was recommended by a linguist. I'll explain } x) \end{aligned}$$

(20b)" **Interpretation of (20)'b (by Trace Conversion)**

$$\begin{aligned} & \llbracket \text{A paper that wasn't recommended by anyone who teaches at UCLA} \rrbracket \\ & (\lambda x \llbracket \text{I'll explain [the}_1 \text{ paper that wasn't recommended by anyone}] \rrbracket^{1 \rightarrow x}) \\ = & \llbracket \text{A paper that wasn't recommended by anyone who teaches at UCLA} \rrbracket \\ & (\lambda x: x \text{ is a paper that wasn't recommended by anyone. I'll explain } x) \end{aligned}$$

Interim summary

- movement structures involve independent, but semantically compatible nominal phrases
- many of these phrases are not pronounced
- What determines the pronunciation of movement structures?

Note: For the Dinka example (*'You all, Ayan has seen [them]'*):

(9) $\exists x_1 [= x_1 \cap \text{SECOND} \cap \text{PL} \cap \text{N}]$ Ayan has seen $[= x_1 \cap \text{PL} \cap \text{N}]$

Assume decomposition of nouns into ϕ -features, a categorizer N, and a root e.g. $\text{PL} \cap \text{FEM} \cap \text{N} \cap \sqrt{\text{LINGUIST}}$.

Supporting child language evidence

Guasti et al. (2023): Children sometimes overpronounce / undercompress material adults leave silent.

- (10) a. silent antonym markers (Sauerland et al. 2024)
- b. silent negation with negative indefinites (Nicolae & Yatsushiro 2022, Driemel et al. 2023)
- c. light null verbs in decomposition (Martin et al. 2022)

Pronounced traces: resumptive noun phrases in children's relative clauses (Labelle 1990 and others):

- (11) Ich möchte das Mädchen sein, das der Opa das Mädchen
 I want the girl be who the granddad the girl
 umarmt.
 hugs
 I want to be the girl who the granddad hugs. (Yatsushiro & Sauerland 2018)

Pronunciation: Some critical examples

LF to PF mapping in a late adjunction example:

$$(12) \quad \exists x_5 \left[\text{I wanted me to } \exists \left[\text{be seeing } \boxed{[= x_5 \cap \sqrt{\text{PICTURE}} \cap \text{N}]} \right] \right. \\ \left. \text{very intensely } \wedge \exists \left[\boxed{[= x_5 \cap \sqrt{\text{PICTURE}} \cap \text{N} \cap \text{by this artist}]} \right] \right]$$

I looked for *a picture* *very intensely* *by this artist*.

Pronouns arise in Ruys (1992) QR-out-of-conjunction example:

$$(13) \quad \boxed{\emptyset} \text{ A student likes } \boxed{\text{every professor}_i} \text{ and wants } \boxed{\text{her}_i} \text{ to be on his committee.}$$

$$\forall x_1 \left[\boxed{\partial \exists [= x_1 \cap \text{N} \cap \sqrt{\text{PROFESSOR}}]} \text{ a student } \exists [\text{likes} \cap \right. \\ \left. \boxed{= x_1 \cap \text{N} \cap \sqrt{\text{PROFESSOR}}]} \text{ and wants } \boxed{= x_1 \cap \text{N} \cap \sqrt{\text{PROFESSOR}} } \right. \\ \left. \text{to be on his committee} \right]$$

Basic conception

- 1** (full) chain: All coindexed NPs (i.e. chain links) in a sentence
- 2** argument position: All positions where the sister of the NP is a predicate
- 3** EPP position: Spec(TP) position of finite verbs, raising-to-object position of ECM verbs
- 4** wh-position: Highest position in the left periphery of a question
- 5** subchain: Section of a chain containing one argument position and all c-commanding co-indexed chain links except those c-commanding also higher argument positions.

EPP positions

There expletives: If a chain link is in an EPP position doesn't contain a $\sqrt{\text{ROOT}}$, pronounce it as *there* with the right agreement.

(14) *I expect there to be coffee left.*

(15) *You can drink the coffee I expect there to be left.*

Total reconstruction: If an EPP position is empty, copy the next lower NP and pronounce it in the EPP position unless it is already pronounced in a wh-position.

(16) *A woman is likely to win this ultra-marathon.* (likely \gg a woman)

(17) *How many women are likely to win this ultra-marathon.* (likely \gg many women)


Wh-positions

Multiple wh: Pronounce the highest wh-phrase in the left periphery of a question.

(18) *Who ~~what~~ Q ~~who~~ ordered what?*

Partial reconstruction: Pronounce also predicates in the highest wh-position that only occur in lower chain links.

(19) *Which article about her did no celebrity read?*

(20) *which article Q did no celebrity read [article about her]*


Maybe extraposed material is exempt from the requirement to be pronounced at the top:

(21) *Which picture did you look for very intensely by this artist.*

QR-positions and pronouns

Undo QR as much as possible: Pronounce quantifiers with the right quantificational force in the EPP or else argument position of that subchain such that they are leftmost.

- (22) *A student likes every professor and wants her to be on his committee.* (every professor \gg a student)

If PP or relative clause modifiers only occur in higher positions, pronounce them there.

- (23) *I looked for a picture very intensely by this artist.*

Pronouns and elsewhere

Pronouns: If material has not been pronounced in a subchain, but it overlaps with one where it has been pronounced, use a pronoun.

(24) Which student ~~student~~ called her[~~student~~] father?

(25) ~~every-prof~~ A student likes every prof and wants her to ...

Strong crossover: The pronoun will be part of the chain and be the trace in (27).

(26) **Which girl did she say [t would win]?*

(27) *Which girl t said she would win?*

Weak crossover: As in QR, a preference for (29) seems to apply.

(28) ??*Which girl did her mother say t would win?*

(29) *Which girl's mother said she would win?*

Effability effect (data point from Itai Bassi, p.c.):

(30) *Which girl did only her mother say t would win?*

Elsewhere: Pronounce material still not pronounced in its subchain in an EPP position or else its argument position.

Locality

Movement binding dependencies: sensitive to island phenomena and require intermediate chain links:

(31) Who did John read a book that wrote?

(32) me e gble be wò for *t* ?

Who you say that he[+wh] hit *t*

Who did you say that -- he hit t? (ewe, Collins 1993, p. 188)

Pronoun binding dependencies: not sensitive to islands, don't allow intermediate chain links

(33) *Who is such that John read a book that she wrote?*

(34) *(Who is such that you said that he[-wh] hit her?)*

Difference not addressed so far.

Intuition: Movement dependencies rely only on semantic compatibility.

Minimality

Binding by the closest compatible NP:

(35) **A man₁ seems a woman to push t₁.*

intended: A man is such that it seems a woman pushes him.

(36) $[N \cap \sqrt{\text{MAN}}]$ seems $[N \cap \sqrt{\text{WOMAN}}]$ to push $[N]$

Minimization: A proposition is true only of states/models that involve the minimum possible number of entities, i.e. one for the following:

$[N \cap \sqrt{\text{WOMAN}}]$ to push $[N]$

In general though minimization makes too strict predictions.

Contrast Blocking Bound Interpretations

(37) An ox pulled a yak.

Minimization of the following would require a yak-ox pulling itself.

(38) $[N \cap \sqrt{OX}]$ pull $[N \cap \sqrt{YAK}]$


Assume: contrast of the two nouns (e.g. exhaustification) adds inferences that block reflexivization.

(39) $[N \cap \sqrt{OX} \cap \neg \Box \sqrt{YAK}]$ pull $[N \cap \sqrt{YAK} \cap \neg \Box \sqrt{OX}]$

Contrast Restricted to Domains

Movement dependencies crossing another nominal require an chain link near the nominal crossed (e.g. van Urk 2018, Keine & Zeijlstra 2024), Dinka:

- (40) Yeyínà yé ké tâak, cí Bôl ké tîŋ
who.PL HAB.2SG PL think PFV.OV Bol.GEN PL see
Who all do you think Bol saw.

- (41)  Yeyínà yé ké tâak, cí Bôl ké tîŋ

Note: The matrix subject needs to be contrasted with the trace *ké* to not bind it.

Proposal: Contrast requires two noun phrase be in a constituent at the intermediate position:

- (42) $[\exists[N \cap 2ND \cap SG] \cap \exists[N \cap PERSON \cap \neg \Box(2ND) \cap \neg \Box(SG)]]$